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OBJECT AVOIDER ROBOT USING ACTOBOTICS RUNT

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Abstract - *There are many ways to build a robot, from scratch a kit, a prebuilt system or combination of any of these methods. The path we will take here will be mostly from a kit and other items such as an Arduino controller, motor driver and sensors. The chassis kit I use for this project is the Peewee which comes from actobotics, from their Runt rover line but any two wheeled small robot kit will work fine as well for this project. I chose the Peewee because it's small, inexpensive, durable, has lots of mounting options and is easy to put together. Obstacle avoiding robot is an intelligent device which can automatically sense the obstacle in front of it and avoid them by turning itself in another direction. All most all robots demands the sort of obstacles detection, hence obstacles avoidance strategy of most importance. Obstacles avoidance robot has a vast field of application. They can be used as service robots, for the purpose of household work and so many other indoor applications. Equally they have great importance in scientific exploration and emergency rescue, there may be places that are dangerous for humans or even impossible for humans to reach directly.*

***Key Words*: Actobotic runt to avoid collision.**

1. INTRODUCTION

Automation or automatic control is the use of various control system for operating equipment such as machinery, processes in factories, boilers and heat treating ovens, switching on telephone networks, steering and stabilization of ships, aircraft and other applications and vehicles with minimal or reduced human intervention. The concept of Mobile Robot is fast evolving and the number of mobile robots and their complexities are increasing with different applications. There are many types of mobile robot navigation techniques like path planning, self – localization and map interpreting. An Obstacle Avoiding Robot is a type of autonomous mobile robot that avoids collision with unexpected obstacles. In robotics, obstacle avoidance is the task of satisfying some control objective subject to non-intersection or non-collision position constraints. In unmanned air vehicles, it is a hot topic. What is critical about obstacle avoidance concept in this area is the growing need of usage of unmanned aerial vehicles in urban areas for especially military applications where it can be very useful in city wars. Normally obstacle avoidance is considered to be distinct from path planning in that one is usually implemented.

1.1 PROPOSED SYSTEM

In this proposing system we using multiple sensor instead of using only one sensor with servo motor, previous technique the single sensor is controlled with servo motor commanded by Arduino, but here the sensors are controlled and commanded by Arduino directly.

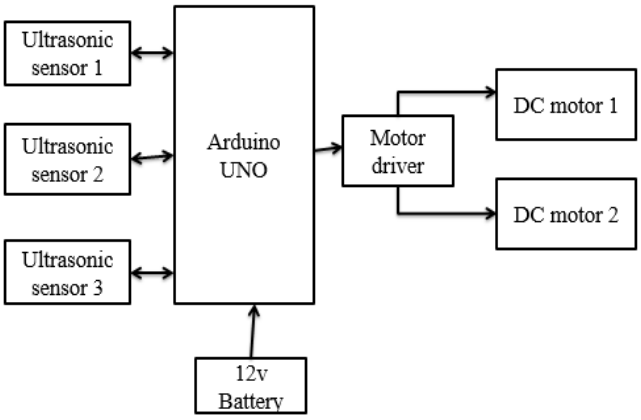

Fig- 1: Proposed diagram

2. MATERIALS AND METHODS

Here we used hardware components like Arduino UNO, Ultrasonic sensor HC-SR04, DC motors, Battery, Motor driver, Chassis and one software to write command program called Arduino IDE.

2.1 ARDUINO UNO

The Uno differs from all preceding boards in that it does not use the FTDI USB-to-serial driver chip. Instead, it features an ATmega16U2 programmed as a USB-to-serial converter. This auxiliary microcontroller has its own USB boot loader, which allows advanced users to reprogram it. The Arduino Uno R3 is a microcontroller board based on a removable, dual-inline-package (DIP) ATmega328 AVR microcontroller. It has 20 digital input/output pins (of which 6 can be used as PWM outputs and 6 can be used as analog inputs). Programs can be loaded on to it from the easy-to-use Arduino computer program. The Arduino has an extensive support community, which makes it a very easy way to get started working with embedded electronics. The R3 is the third, and latest, revision of the Arduino Uno. There are many varieties of Arduino

boards that can be used for different purposes. Some boards look a bit different from the one below, but most Arduino have the majority of these components in common.

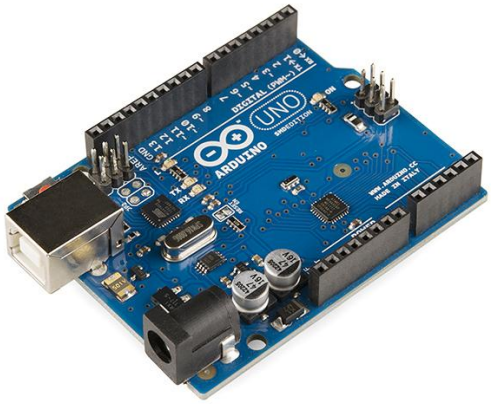

Fig-2: Arduino UNO.

2.2 DC MOTOR

Geared DC motors can be defined as an extension of DC motor which already had its Insight details demystified here. A geared DC Motor has a gear assembly attached to the motor. The speed of motor is counted in terms of rotations of the shaft per minute and is termed as RPM .The gear assembly helps in increasing the torque and reducing the speed. Using the correct combination of gears in a gear motor, its speed can be reduced to any desirable figure. This concept where gears reduce the speed of the vehicle but increase its torque is known as gear reduction. This Insight will explore all the minor and major details that make the gear head and hence the working of geared DC motor.

Fig-3: DC motor

2.3 ULTRASONIC SENSOR

The ultrasonic sensor works on the principle of SONAR and RADAR system which is used to determine the distance to an object. An ultrasonic sensor generates the high-frequency sound (ultrasound) waves. When thi**s** ultrasound hits the object, it reflects as echo which is sensed by the receiver.

Fig-4: HC-SR04 Module

2.4 MOTOR DRIVER

The L298N is an integrated monolithic circuit in a 15- lead Multiwatt and PowerSO20 packages. It is a high voltage, high current dual full-bridge driver de-signed to accept standard TTL logic level sand drive inductive loads such as relays, solenoids, DC and stepping motors. Two enable inputs are provided to enable or disable the device independently of the in-put signals .The emitters of the lower transistors of each bridge are connected together rand the corresponding external terminal can be used for the connection of an external sensing resistor. An additional Supply input is provided so that the logic works at a lower voltage.

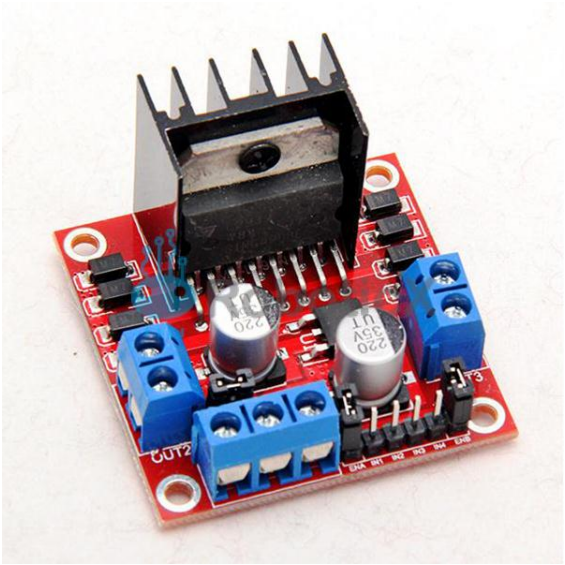

Fig-5: L298N Motor driver

2.5 BATTERY

All lead acid batteries consist of flat lead plates immersed in a pool of electrolyte. Regular water addition is required

for most types of lead acid batteries although low-maintenance types come with excess electrolyte calculated to compensate for water loss during a normal lifetime. Lead acid batteries used in the RV and Marine Industries usually consist of two 6-volt batteries in series, or a single 12-volt battery. These batteries are constructed of several single cells connected in series each cell produces approximately 2.1 volts. A six-volt battery has three single cells, which when fully charged produce an output voltage of 6.3 volts. A twelve-volt battery has six single cells in series producing a fully charged output voltage of 12.6 volts. A battery cell consists of two lead plates a positive plate covered with a paste of lead dioxide and a negative made of sponge lead, with an insulating material (separator) in between.

2.6 ARUDINO IDE

The Arduino Integrated Development Environment (IDE) is a cross-platform application (for Windows, macOS, Linux) that is written in functions from C and C++. It is used to write and upload programs to Arduino compatible boards, but also, with the help of 3rd party cores, other vendor development boards. The source code for the IDE is released under the GNU General Public License, version 2.The Arduino IDE supports the languages C and C++ using special rules of code structuring. The Arduino IDE supplies a software library from the Wiring project, which provides many common input and output procedures. User-written code only requires two basic functions, for starting the sketch and the main program loop, that are compiled and linked with a program stub main() into an executable cyclic executive program with the GNU tool chain, also included with the IDE distribution. The Arduino IDE employs the program to convert the executable code into a text file in hexadecimal encoding.

3. SYSTEM IMPLEMENTATION

The bot was now ready to process the function of the project. The bot was controlled over by the Arduino board which is the main part of the bot. There are three ultrasonic sensor was connected with the Arduino board placed in front, right and left side of the bot. A motor driver circuit is used to control the DC motors to move front and sides, four DC motor are placed under the chasis of the bot. A 12V battery was connected with the Arduino board for power supply. When the battery is switched ON the bot starts move towards front side once if find any obstacles in the front path it analyze the ultrasonic sensor on both sides and moves towards the free path, the first preference will give to left side and then to the right side.

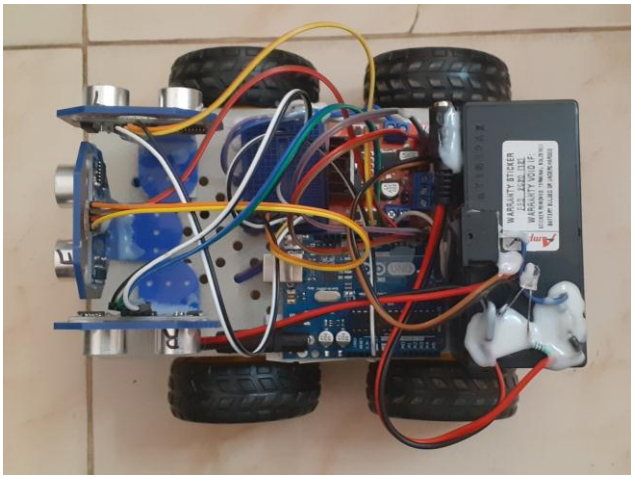

Fig-6: Top view of the bot

4. CONCLUSION

The overall bot will be useful in the future environment. It contains the process like autonomous vehicle, the robot and unmanned domestic vehicles. Even though it was useful in risky areas like prone based areas, it will work in the places even humans can't through it. If we place a camera on the top of the bot it will use to analyze present condition of the areas and in gassing areas which are harmful to humans.

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